



**Massachusetts Bay
Transportation Authority**

Fellsway and Lynn Garages

Bus Operations Overview

January 2017



Agenda

Service Information

Fleet Overview

Facilities Overview

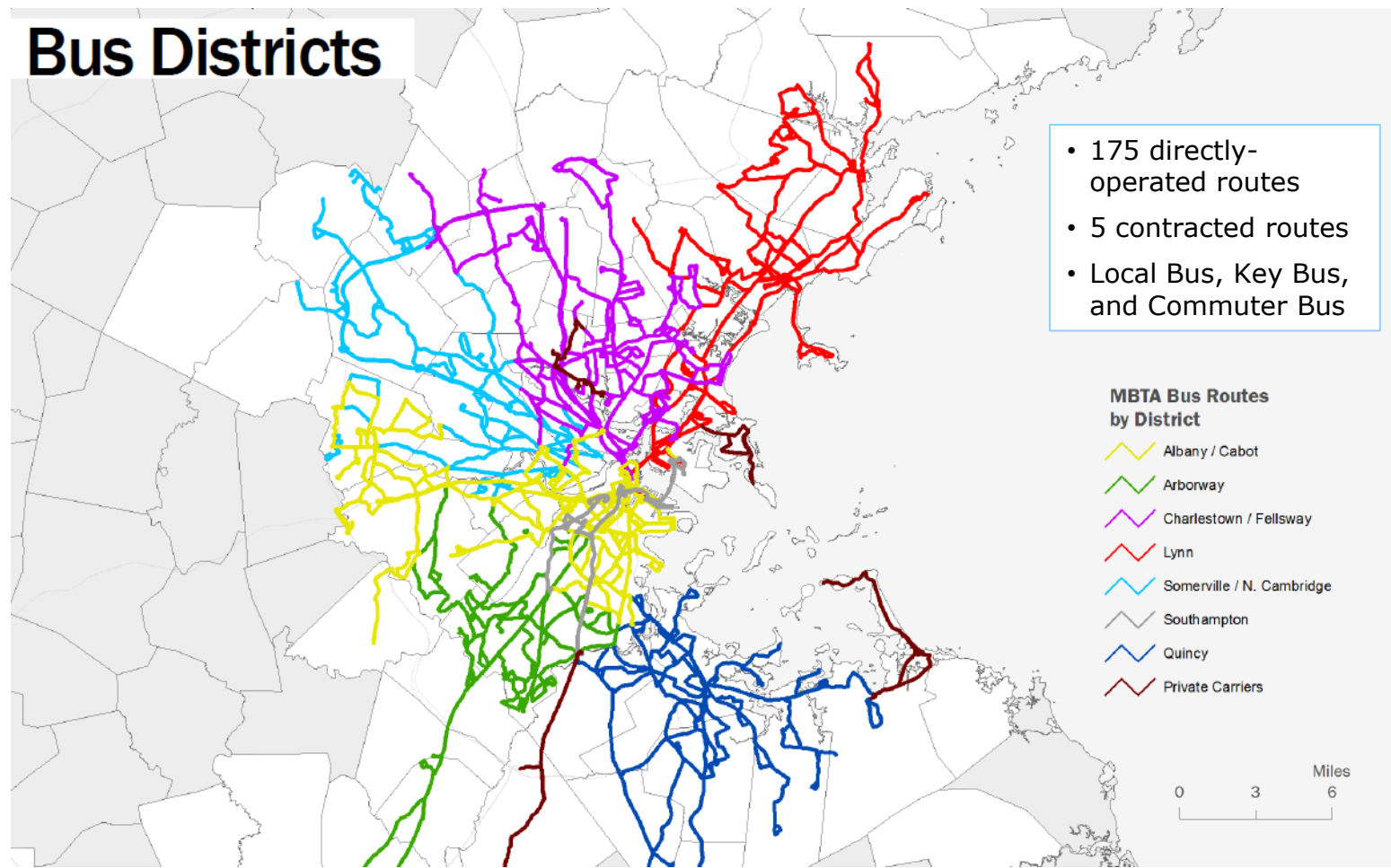
Staff Overview

Financials

Key Operational and Cost Performance Metrics



The MBTA currently provides 175 directly-operated and 5 contracted routes

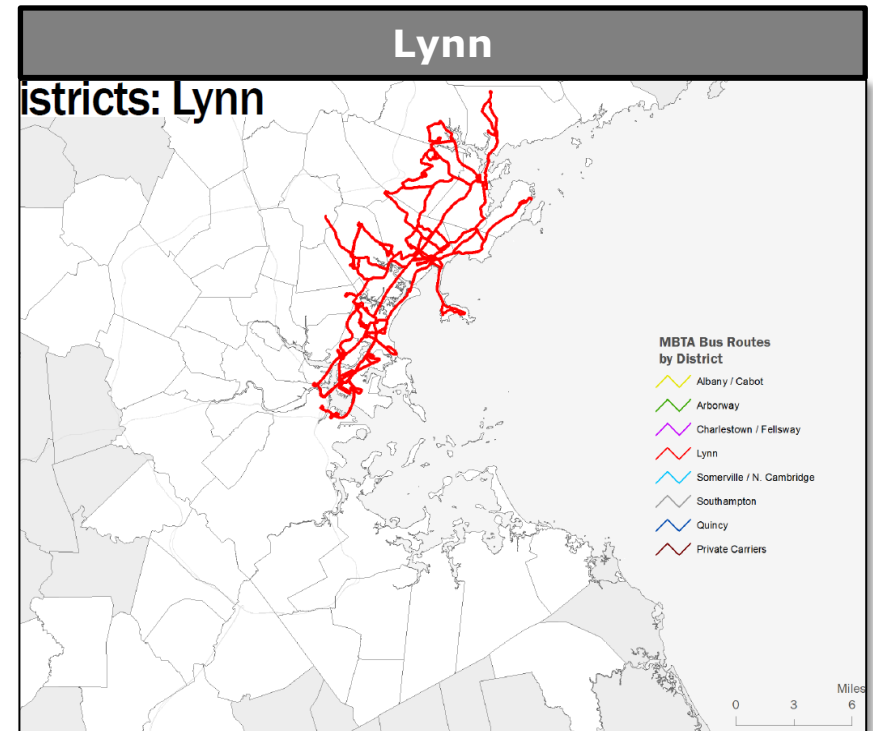
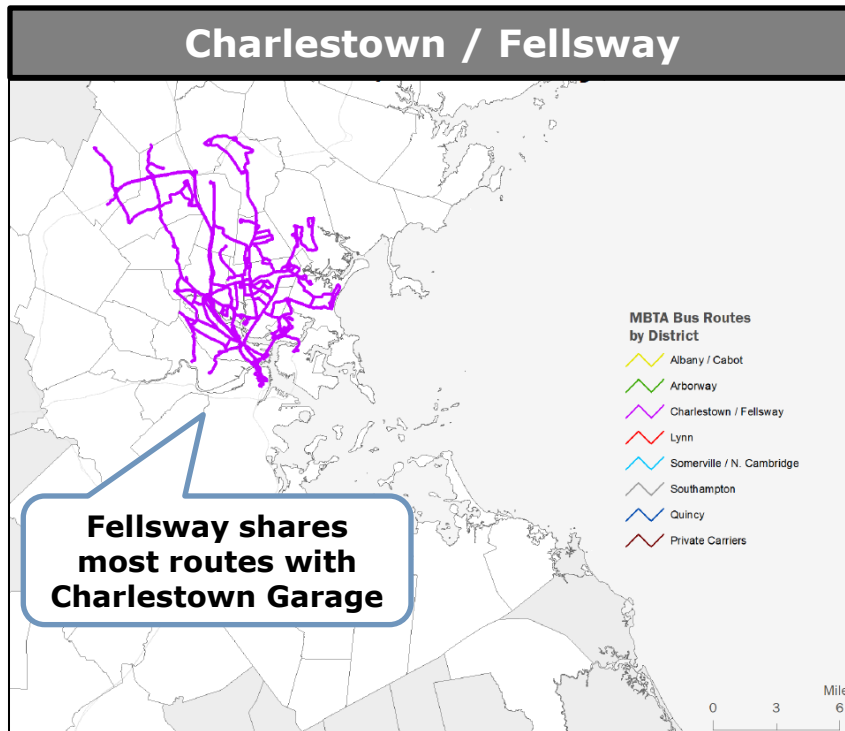


Source: MBTA Office of Performance Management and Innovation

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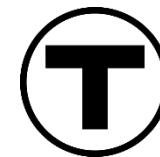
Charlestown / Fellsway and Lynn Districts



Fellsway and Lynn primarily serve northern portions of the metro Boston area

Source: MBTA Office of Performance Management and Innovation

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Fellsway: FY16 Revenue Hours, Ridership, and Fare Revenue by Route

FY16 Fellsway Route-Level Statistics:

Route	Total Sched. Revenue Hrs.	Revenue Hours – Fellsway	Est. Annual Rdshp.	Alloc. Fare Revenue
60	13,840	3,460	429,198	\$335,913
94	11,391	8,544	500,760	\$378,701
95	11,621	8,716	483,262	\$379,972
96	14,803	11,102	628,415	\$470,399
97	5,783	4,337	306,332	\$248,181
99	11,380	8,535	480,360	\$394,166
100	7,264	5,448	285,756	\$229,687
105	6,815	5,111	358,946	\$285,476
106	16,021	12,016	954,673	\$773,355
131	4,701	3,525	173,212	\$85,499
132	5,982	4,487	270,343	\$166,750
134	16,003	12,003	630,594	\$478,703
136	8,671	6,503	319,894	\$216,969
137	8,287	6,215	295,745	\$205,573

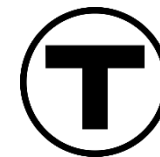
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Route	Total Sched. Revenue Hrs.	Revenue Hours – Fellsway	Est. Annual Rdshp.	Alloc. Fare Revenue
354	8,389	8,389	198,796	\$98,473
411	7,513	5,635	333,242	\$229,995
430	7,795	5,847	345,166	\$241,097
TOTAL	166,262	119,874	6,994,692	\$5,218,909

FY16 Actual Revenue
Hrs. = **104K**

Note: Fellsway garage's routes are all part of Cabot and Charlestown "bus districts"; Fellsway garage does not operate on weekends and thus shares routes with both Cabot (Route 60) and Charlestown garages (remainder of routes); fare revenues allocated to individual routes based on average fares and ridership (typical weekday, Saturday and Sunday boardings)

Source: MBTA Internal Data



Lynn: FY16 Revenue Hours, Ridership, and Fare Revenue by Route

FY16 Lynn Route-Level Statistics:

Route	Scheduled Revenue Hrs.	Est. Annual Ridership	Allocated Fare Revenue
114	1,888	121,888	\$60,165
116	23,916	1,906,601	\$1,574,636
117	21,539	1,647,521	\$1,444,565
119	7,833	346,679	\$274,144
120	15,705	893,844	\$669,632
121	1,654	128,050	\$63,207
424	1,864	70,408	\$34,876
426	17,987	581,381	\$442,974
428	1,688	43,628	\$21,611
429	14,431	485,311	\$391,137
431	1,027	10,213	\$7,700
434	652	13,234	\$6,555
435	9,491	268,003	\$251,428
436	9,290	215,228	\$146,280
439	1,051	27,300	\$13,476

(cont.)

Route	Scheduled Revenue Hrs.	Est. Annual Ridership	Allocated Fare Revenue
441	11,350	459,784	\$422,285
442	16,646	673,967	\$580,000
448	1,902	39,182	\$19,409
449	2,103	53,274	\$26,389
450	16,795	518,731	\$451,762
451	3,140	43,030	\$21,240
455	17,650	811,600	\$786,882
456	2,620	68,770	\$33,946
459	10,153	274,300	\$135,874
465	6,173	96,049	\$66,518
TOTAL	218,545	9,797,975	\$7,946,691

FY16 Actual Revenue
Hrs. = **209K**

Note: Fare revenues allocated to individual routes based on average fares and ridership (typical weekday, Saturday and Sunday boardings)
Source: MBTA Internal Data



Agenda

Service Information

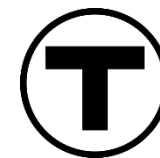
Fleet Overview

Facilities Overview

Staff Overview

Financials

Key Operational and Cost Performance Metrics

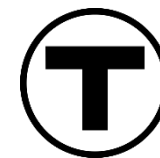


Bus Fleet Allocation by Garage (before arrival of incoming New Flyer fleet)

MBTA Bus Fleet Allocation by Garage (as of 07/01/2016)

Facility	Number of Buses	Fleet Avg. Age (years)	Spare Buses (Garage Total – AM Peak)	Spare Ratio
Albany	116	12	24	21%
Arborway	120	12	21	18%
Cabot	178	12	27	15%
Charlestown	248	11	60	24%
Fellsway	76	12	21	28%
Lynn	89	8	14	16%
North Cambridge	28	12	18	64%
Quincy	86	8	27	31%
Southampton	99	11	39	39%
TOTAL	1,040	11	251	24%

Note: An additional 4 buses are assigned to Everett Bus Shop; does not include 123 buses that will have arrived by end of calendar year 2016 at Arborway, Cabot, and Southampton as part of New Flyer Procurement; does not include Cabot Tire Shop
Source: MBTA Internal Data; National Transit Database (NTD)



Bus Fleet Detailed Specifications (before arrival of incoming New Flyer fleet)

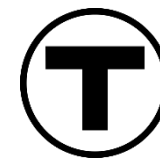
Bus Fleet Detailed Specifications – NTD Reporting* (Calendar Year 2015)

OEM	Total Vehicles	Active Vehicles	Model	Year Manufactured	Year Rebuilt	Fuel Type	Vehicle Length (FT)	Seating Capacity	Standing Capacity	Miles This Year
New Flyer	15	12	600116	2001		CNG	40	39	56	130,135
NABI	299	299	2001-2299	2004	2010	CNG	40	39	55	7,471,234
Neoplan	18	18	10011044	2003		CNG	60	57	81	309,853
Neoplan	193	193	04010593	2004		Diesel	40	38	58	3,806,322
Neoplan	32	0	11011132	2004		CNG	60	47	71	(Retired)
NOVA	110	100	0010400	1994	2003	Diesel	40	40	60	1,012,886
New Flyer	310	308	600909	2006		Diesel	40	39	50	10,836,875
New Flyer	60	60	1400-1459	2014		Diesel	40	37	50	878,319
New Flyer	22	22	1200-1224	2010		Diesel	60	57	81	527,501
Neoplan	22	22	1001-1020,1030	2004		Dual	60	57	81	302,280

Fellsway has 76 of Neoplan 40 FT ECD fleet; **Lynn** has 89 of the New Flyer 40 FT ECD fleet

Source: MBTA Internal Data; National Transit Database (NTD)

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Ongoing and Future Procurements

Ongoing and Future Procurements:

Vehicle Type	Model	# of Vehicles	Scheduled Arrival	Manufacturer	Propulsion
Bus (BU)	New Flyer XN 40FT	175	Oct 2016 - Aug 2017	New Flyer of America	CNG
Bus (BU)	New Flyer XDE 40FT	150	Oct 2016 - Aug 2017	New Flyer of America	Diesel Hybrid
Articulated Bus (AB)	New Flyer XDE 60FT	44	Oct 2016 - Aug 2017	New Flyer of America	Diesel Hybrid
Bus (BU)	New Flyer XDE 40FT	60	TBD	New Flyer of America	Diesel Hybrid



Arborway, Cabot, and Southampton garages to receive newly procured buses

Note: An additional 4 buses are assigned to Everett Bus Shop; does not include 123 buses that will have arrived by end of calendar year 2016 at Arborway, Cabot, and Southampton as part of New Flyer Procurement
Source: MBTA Internal Data



Agenda

Service Information

Fleet Overview

Facilities Overview

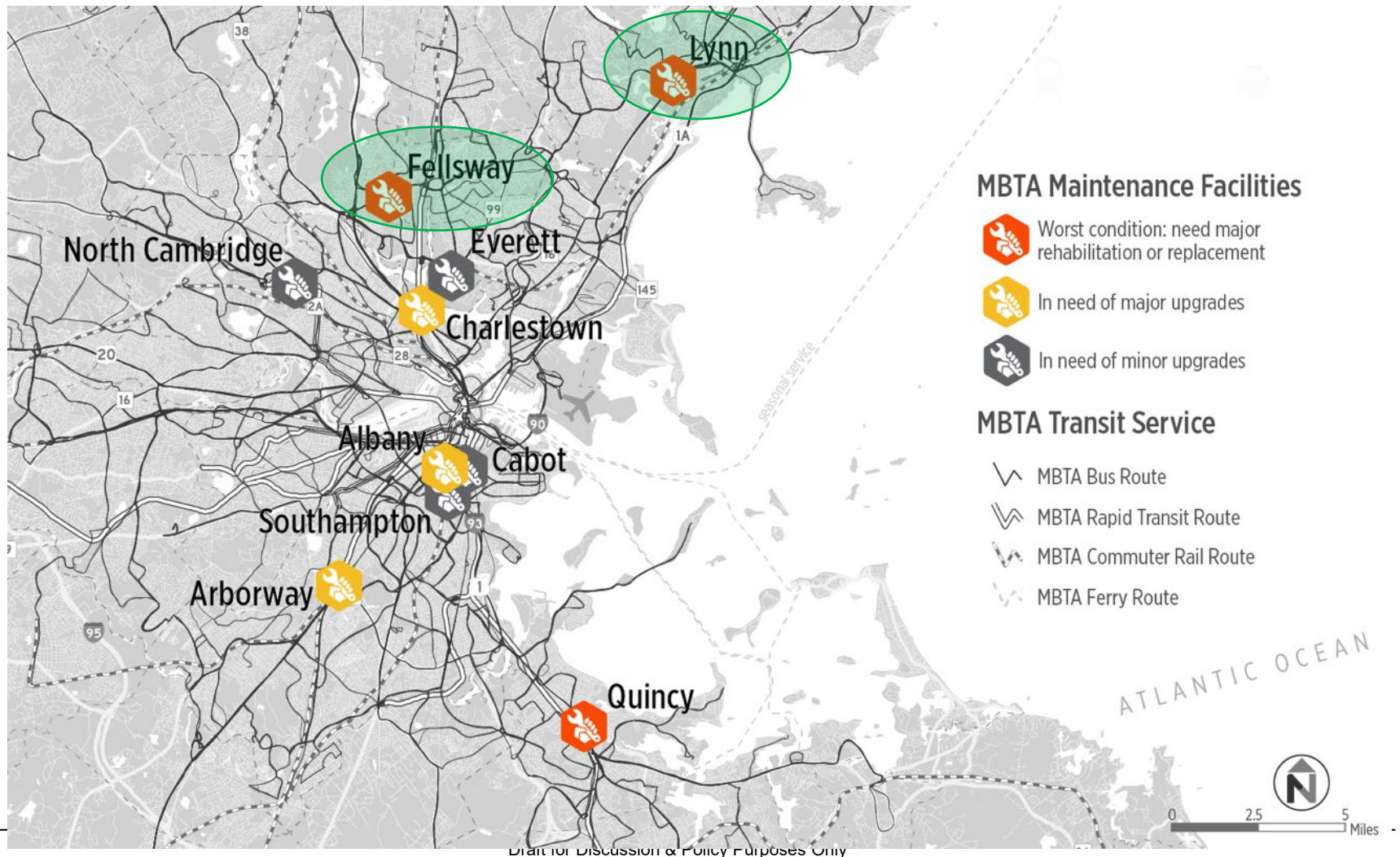
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Financials

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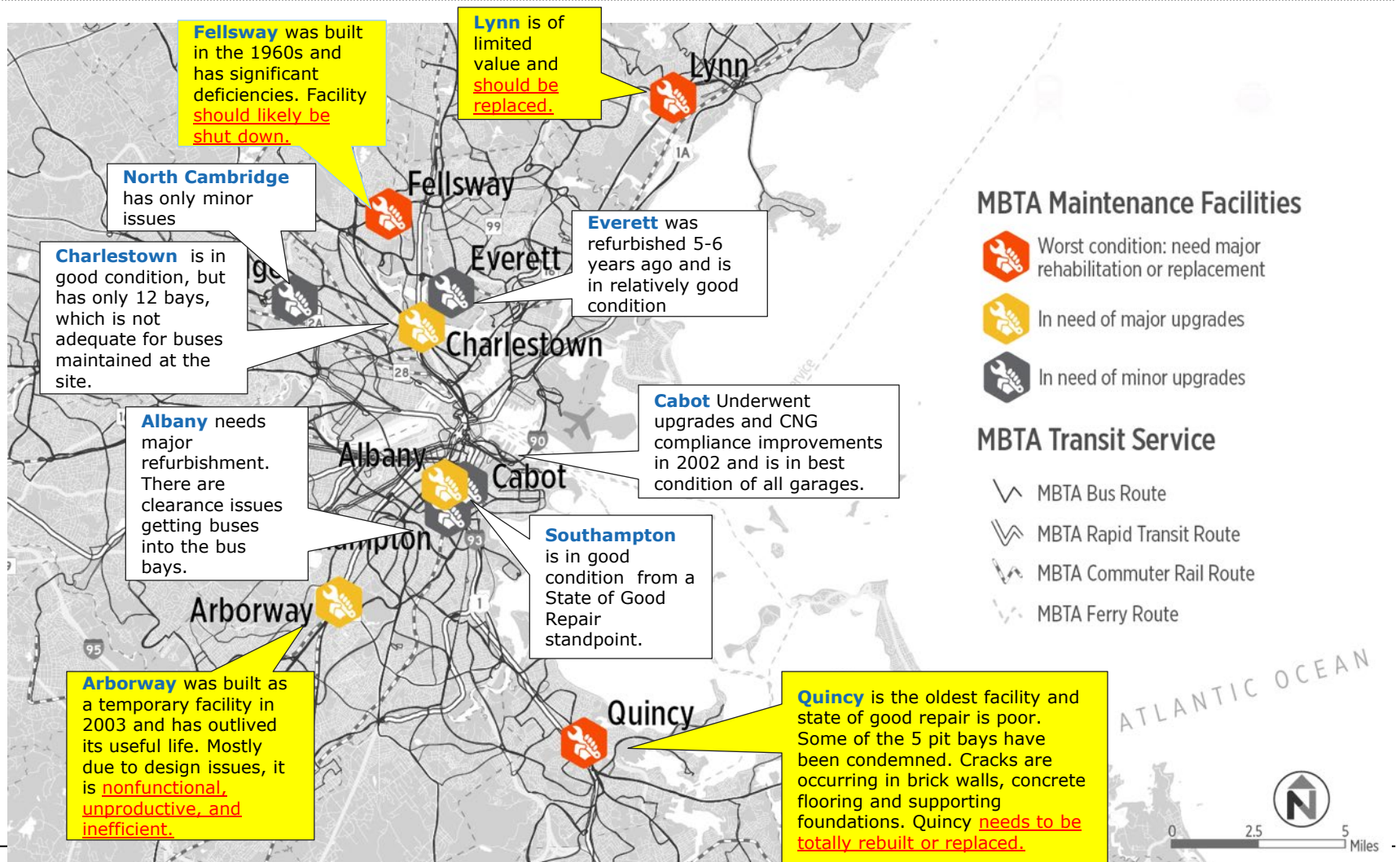


MBTA operates 9 bus garages and 1 heavy repair facility






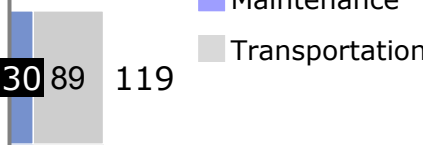
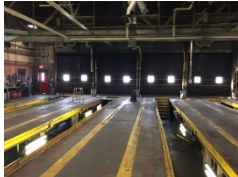
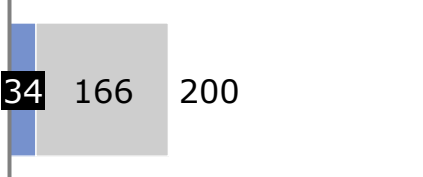



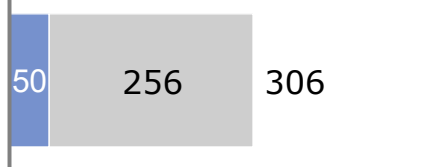
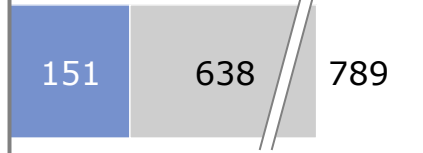
Findings from MassDOT “FOCUS 40” Report



Source: MBTA 2014 Blue Book and “MBTA Maintenance Facility Analysis: Walk Around Document,” December 2014, and MBTA document “Evaluation/Condition Assessment of MBTA Bus Maintenance Facilities,” recent but undated.



Fellsway and Lynn are 2 of 4 garages identified as needing to be rebuilt or replaced

Facility	Assessment per MassDOT Focus40	FY16 cost ²	FY16 avg. headcount	# of buses
Fellsway (Built 1925) 	"Very poor condition."	\$13M		76
Lynn (Built 1936) 	"Not suitable for maintenance of modern vehicles. Prior assessment recommended converting to storage and operations only and relocating maintenance"	\$24M		89
Quincy (Built 1930) 	"Built in 1930. In poor condition and not suitable for modern maintenance needs and practices. Needs to be rebuilt or replaced"	\$20M		86
Arborway (Built 2000 ¹) 	"Temporary facility built in 2003. Some facilities in trailers, and only six repair bays for 119 buses."	\$35M		120
Total		\$111M ³		371

1 Built in 2000 as a temporary facility

2 Total transportation and maintenance cost of facility, not including any allocation of Everett heavy repair facility

3 Includes ~\$19M of Everett and Admin allocation

Source: MBTA Internal Data



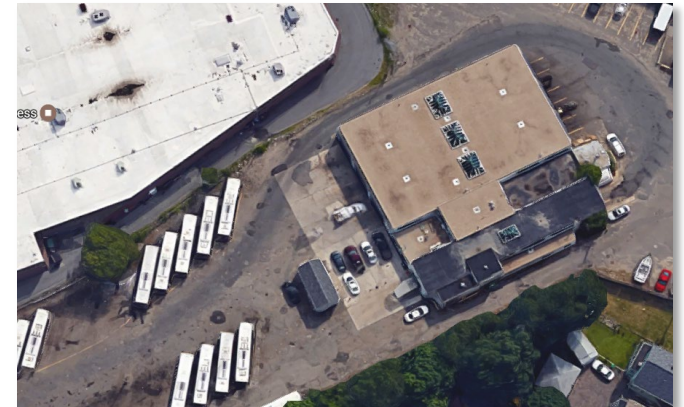
Fellsway Garage

Garage Overview	
Year Built	1925
# of Maintenance Personnel*	28
# of Buses^	76
Bus Fleet Types	40FT ECD
Facility Space	
Total Square Ft.	13,000
# of Maintenance Bays	6
Overnight Bus Storage Capacity (Indoor / Outdoor)	0 / 74
# of Service Lanes	1
# of Shifts (Weekday / Weekend)	3 / 0

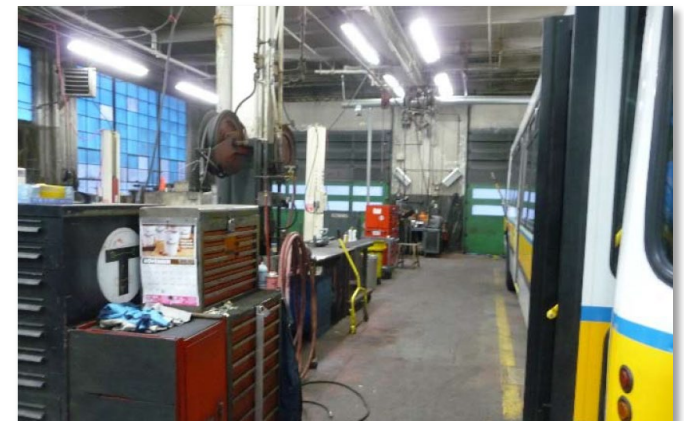
*Includes machinists, fuelers, car cleaners, forepersons, and supervisors

^Reflects number of buses as of 7/1/2016

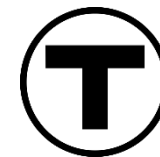
Source: MBTA Internal Data (compiled on behalf of MBTA by CH2M Hill)



Aerial View – 459 Salem St., Medford, MA



Maintenance Area



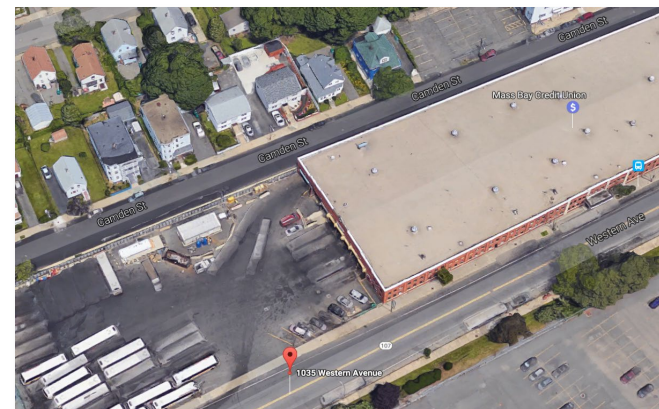
Lynn Garage

Garage Overview	
Year Built	1936
# of Maintenance Personnel*	29
# of Buses^	89
Bus Fleet Types	40FT ECD
Facility Space	
Total Square Ft.	46,200
# of Maintenance Bays	10
Overnight Bus Storage Capacity (Indoor / Outdoor)	60 / 40
# of Service Lanes	1
# of Shifts (Weekday / Weekend)	3 / 3

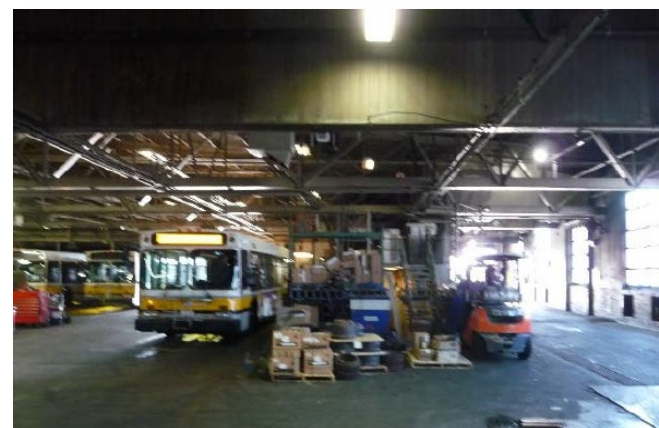
*Includes machinists, fuelers, car cleaners, forepersons, and supervisors

^Reflects number of buses as of 7/1/2016

Source: MBTA Internal Data (compiled on behalf of MBTA by CH2M Hill)



Aerial View – 1035-1043 Western Ave., Lynn, MA



Staging Area



Agenda

Service Information

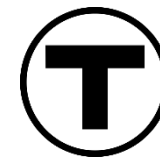
Fleet Overview

Facilities Overview

Staff Overview

Financials

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There are 245 transportation and 55 maintenance employees in Fellsway and Lynn

	JOB DESCRIPTION	UNION	FELLSWAY*	LYNN	GRAND TOTAL
BUS MAINTENANCE	Fueler	L264	3	6	9
	Cleaner, Car	L589		2	2
	Machinist	L264	17	15	32
	Machinist (Grandfathered 11/08)	L264	1		1
	Foreperson, Automotive	ALL	3	5	8
	Foreperson, Auto Maintenance	ALL	1	1	2
	Supervisor, Bus Maintenance	L453	1		1
SUBTOTAL - MAINTENANCE			26	29	55
BUS TRANSPORTATION	Operator, Part-Time Surface	L589	20	34	54
	Operator, Surface	L589	53	118	171
	Inspector, Bus	L600	7	10	17
	Supervisor, Bus Transportation	L453		1	1
	Superintendent, Bus Transportation	TEA		1	1
SUBTOTAL - TRANSPORTATION			81	164	245
GRAND TOTAL			107	193	300

*Fellsway transportation staff shared with Charlestown garage (Fellsway-specific staff estimated based on proportion of total vehicle hours)

Note: Reflects active and paid headcount as of 12/9/2016 (i.e., does not include union officials and other employees on unpaid leave – 20 total);

Source: MBTA Internal Data

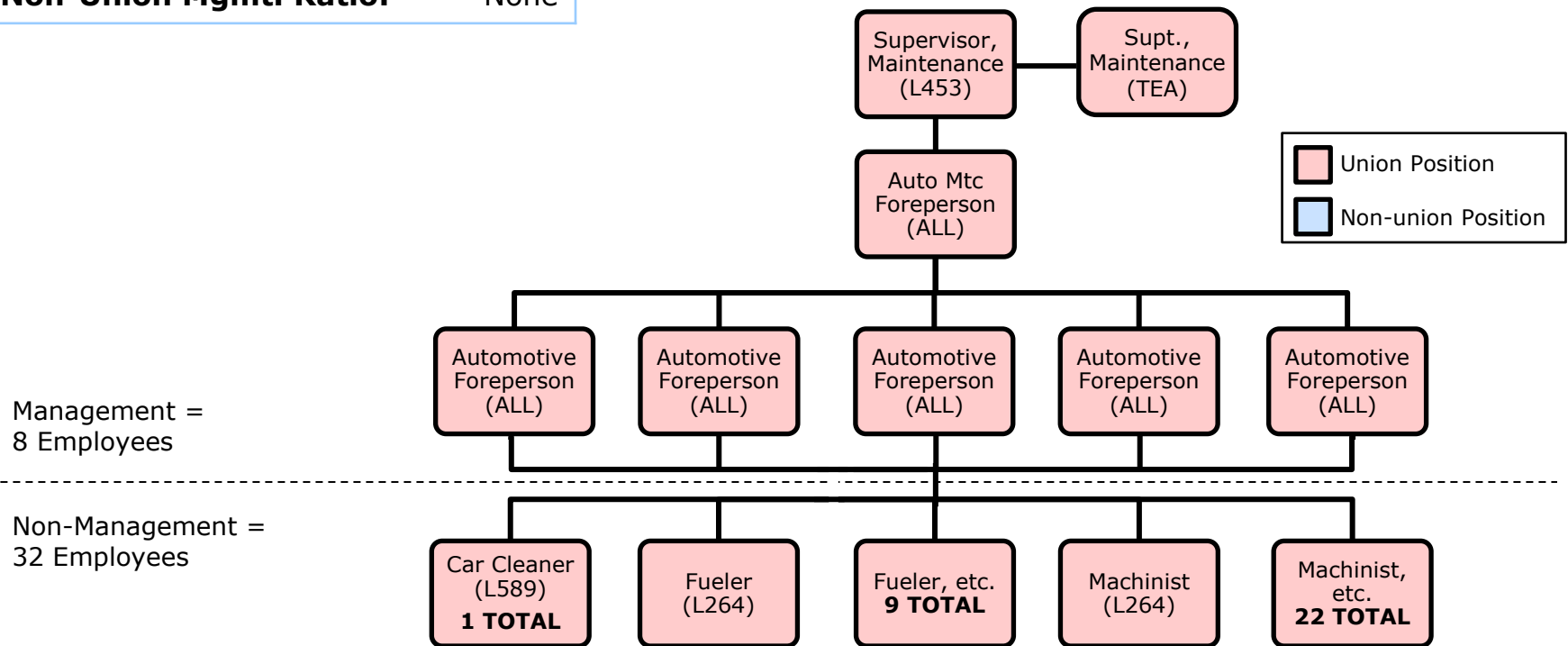


Example Garage Org. Chart - Arborway

Management Ratio: 1 : 4

Non-Union Mgmt. Ratio: None

ARBORWAY GARAGE



Note: Reflects count of active and paid employees as of 12/09/2016 (i.e., does not include union officials and other employees on unpaid leave)
Source: MBTA Internal Data



Agenda

Service Information

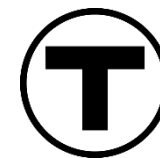
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Facilities Overview

Staff Overview

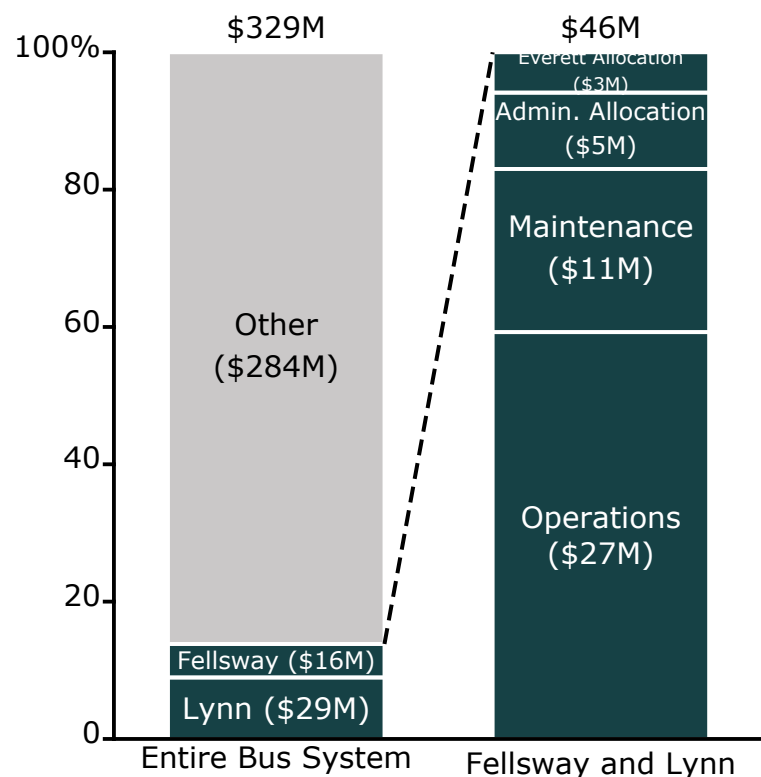
Financials

Key Operational and Cost Performance Metrics



Fellsway and Lynn accounted for \$46M in costs in FY16

FY16 MBTA Bus Operations
and Maintenance Costs



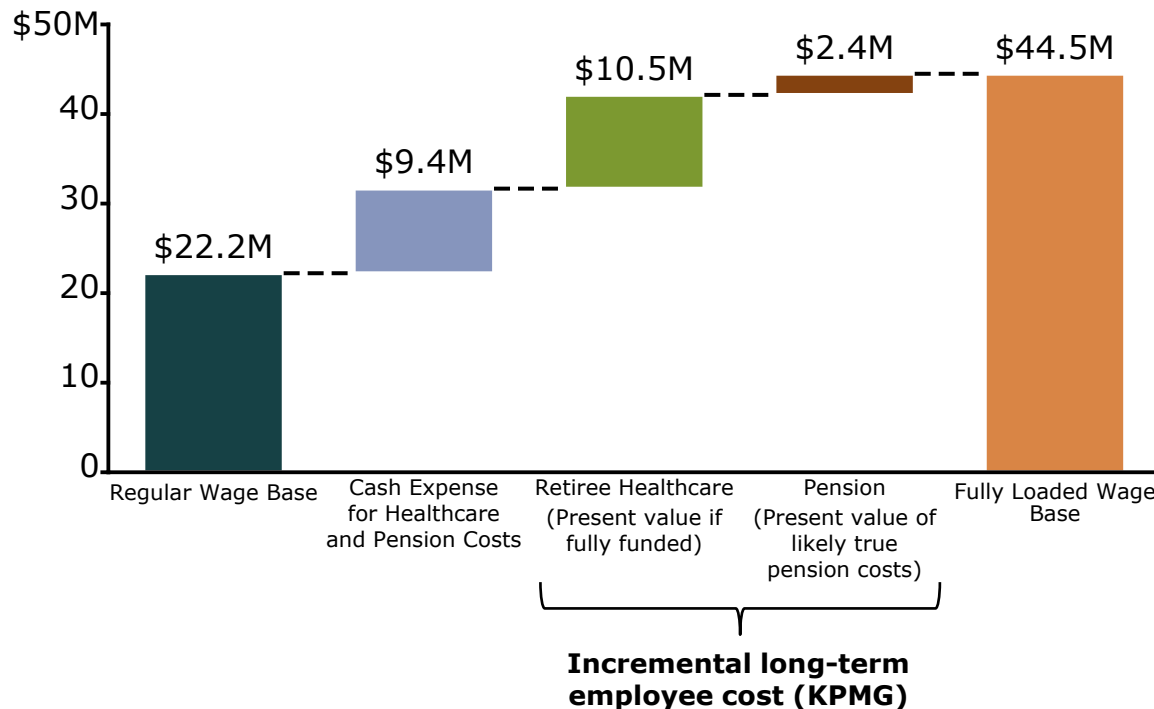
(\$M)	<u>Fellsway</u>	<u>Lynn</u>	<u>TOTAL</u>
<u>Operations</u>	\$8.8	\$18.2	\$27.0
Regular Wages	\$5.6	\$11.4	\$17.1
Overtime	\$0.3	\$0.8	\$1.1
Cash Fringe	\$2.9	\$5.9	\$8.8
<u>Maintenance</u>	\$4.7	\$6.1	\$10.8
Regular Wages	\$2.4	\$2.7	\$5.1
Overtime	\$0.1	\$0.2	\$0.4
Cash Fringe	\$1.3	\$1.4	\$2.7
Materials and Services	\$0.9	\$1.8	\$2.6
<u>Admin. Alloc.</u>	\$1.7	\$3.4	\$5.1
<u>Everett Alloc.</u>	\$0.9	\$1.8	\$2.7

Note: portion of Everett heavy repair facility and G&A (admin.) costs allocated to garages based on their proportion of annual vehicle hours
Source: MBTA Internal Data



Accounting for fully loaded wages of MBTA employees increases FY16 costs at these garages to \$56M

FY16 Bus System Wages - Fellsway and Lynn



Fellsway and Lynn (\$M)	
Regular Wages	\$22.2
Cash Expense for Healthcare and Pension	\$9.4
Retiree Healthcare	\$10.5
Pension (5% discount)	\$2.4
Overtime, incl. FICA	\$1.5
Materials & Services	\$2.6
Admin. Allocation	\$5.1
Everett Allocation	\$2.7
TOTAL	\$56.4

Note: Actuarially derived pension fund liability calculations use a 7.75% discount rate. However, average historical pension fund returns have underachieved, increasing MBTA's pension contribution and unfunded liability over time. Given current low return environment and pension profile, a 5.0% discount rate more fully reflects MBTA's expected costs. \$2.4M represents incremental funds required to fund a 5.00% discount rate environment.

Source: MBTA Internal Data



Agenda

Service Information

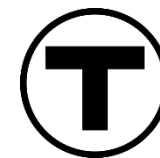
Fleet Overview

Facilities Overview

Staff Overview

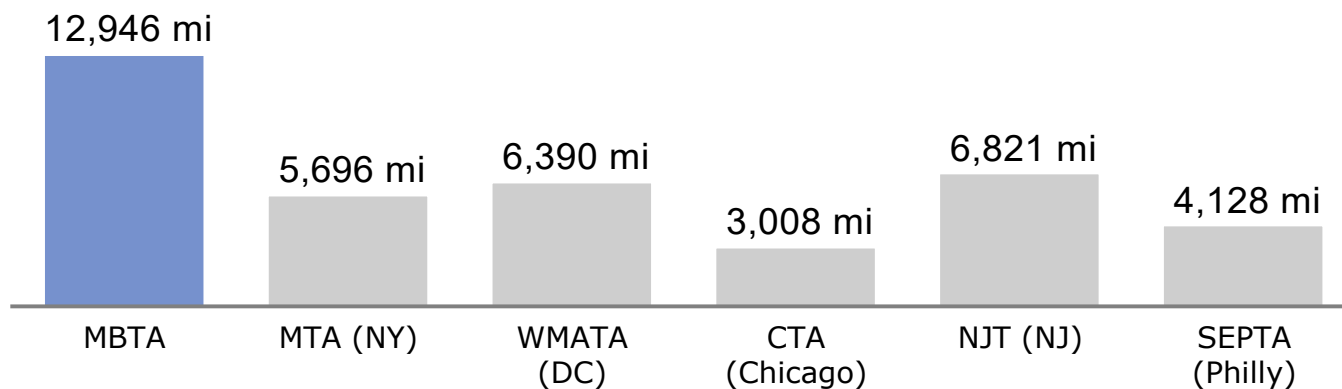
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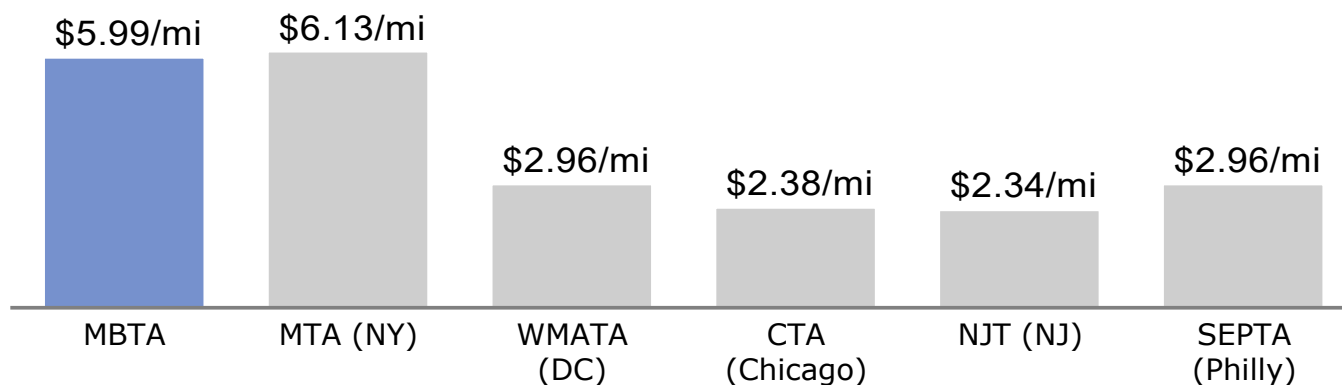


MMBF and Cost per Mile

Mean miles between failures (MMBF)



Maintenance cost per mile (fully loaded, incl. fuel)*





*Reflects cost per mile figures as calculated for and reported to National Transit Database (NTD)
Source: MBTA bus maintenance audit (CH2M Hill, conducted Spring 2016); National Transit Database



Standard Repair Times

- Bus Maintenance management has implemented SRTs for 116 out of 840 total tasks
 - Initial focus on high-frequency, high-volume tasks
- All future fleets will come with suggested SRTs from the OEM (verified by training staff)
- Work Orders now printed with a bulleted list of tasks currently covered by SRTs
- Progress still to be made: analysis for month of October across sample of 6 garages showed that 12% of total MCRS2 hours were covered by SRTs*

<div>  <div> Labor Standards Coverage From 10/01/2016 Through 10/31/2016 SUMMARY </div> <div>  </div> </div>				
This report omits NOVA, NABI, CNG 60 FT, DIESEL CONT B, 09-NF-DLF-60-HYBRID, CNG NEW FLYER, NEW FLYER HYBRID, and 15-ELDORADO-H-40 standards classes and Everett locations (413 and 414).				
	TOTAL TASKS	TASKS WITH STANDARDS	TOTAL HOURS	% HOURS WITH STANDARDS
442 - ALBANY GARAGE				
ECD NEOPLAN 40FT-2ND LIFE - REBUILT NEOPLAN 40FT ECD				
ECD NEOPLAN 40FT-2ND LIFE - REBUILT NEOPLAN 40FT ECD	220	28	3,699.22	9.89%
442 - ALBANY GARAGE	220	28	3,699.22	9.89%
REPORT LABOR TOTALS:			20,391.38	12.49%

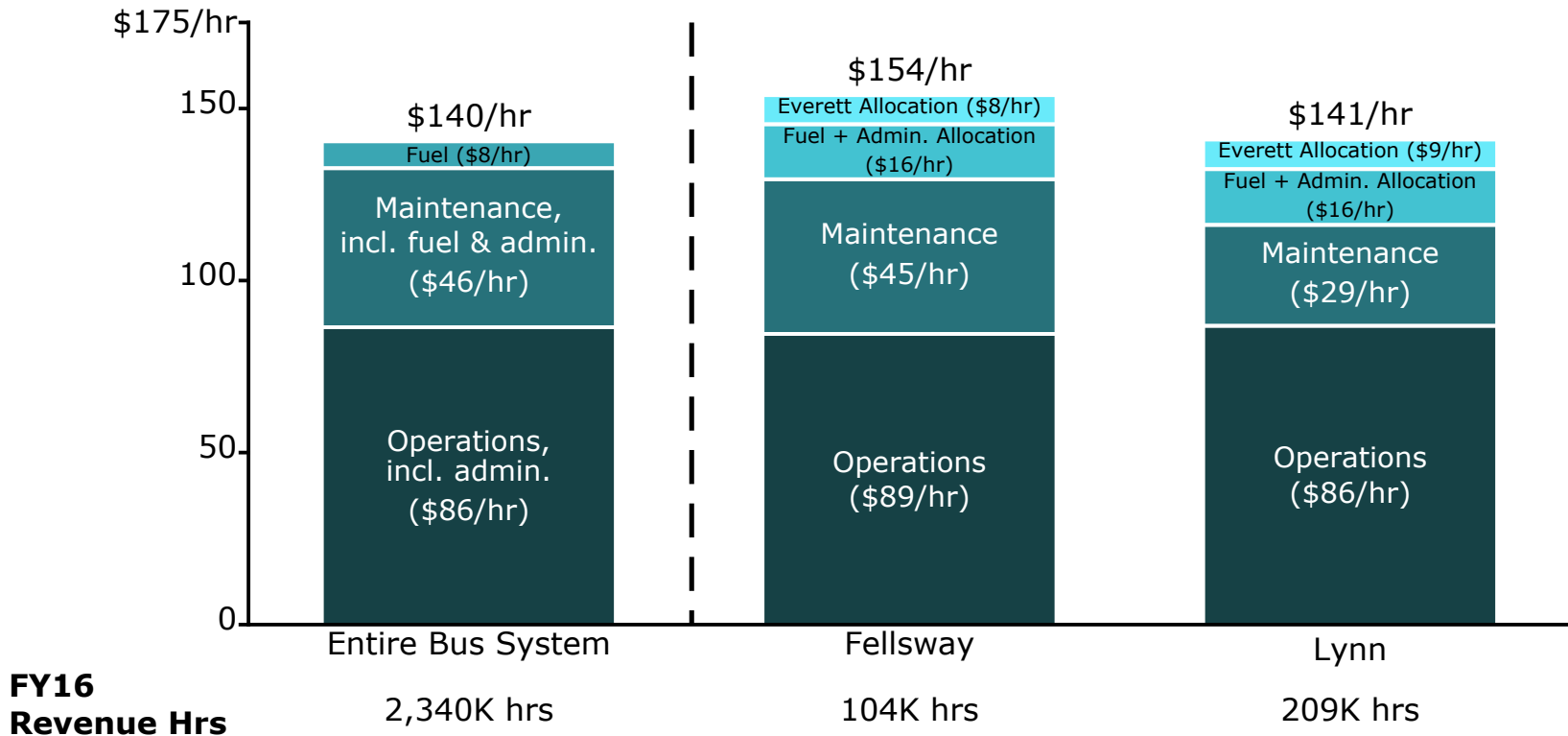
More SRTs currently being developed

*Analysis covered total MCRS2 hours in Oct 2016 for all job classifications at Albany, Fellsway, Charlestown, Quincy, Lynn, and Southampton
 Source: MBTA Bus Maintenance Progress Report; MBTA Internal Data



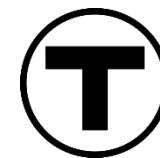
Cost per revenue hour

FY16 Cost per Revenue Hour

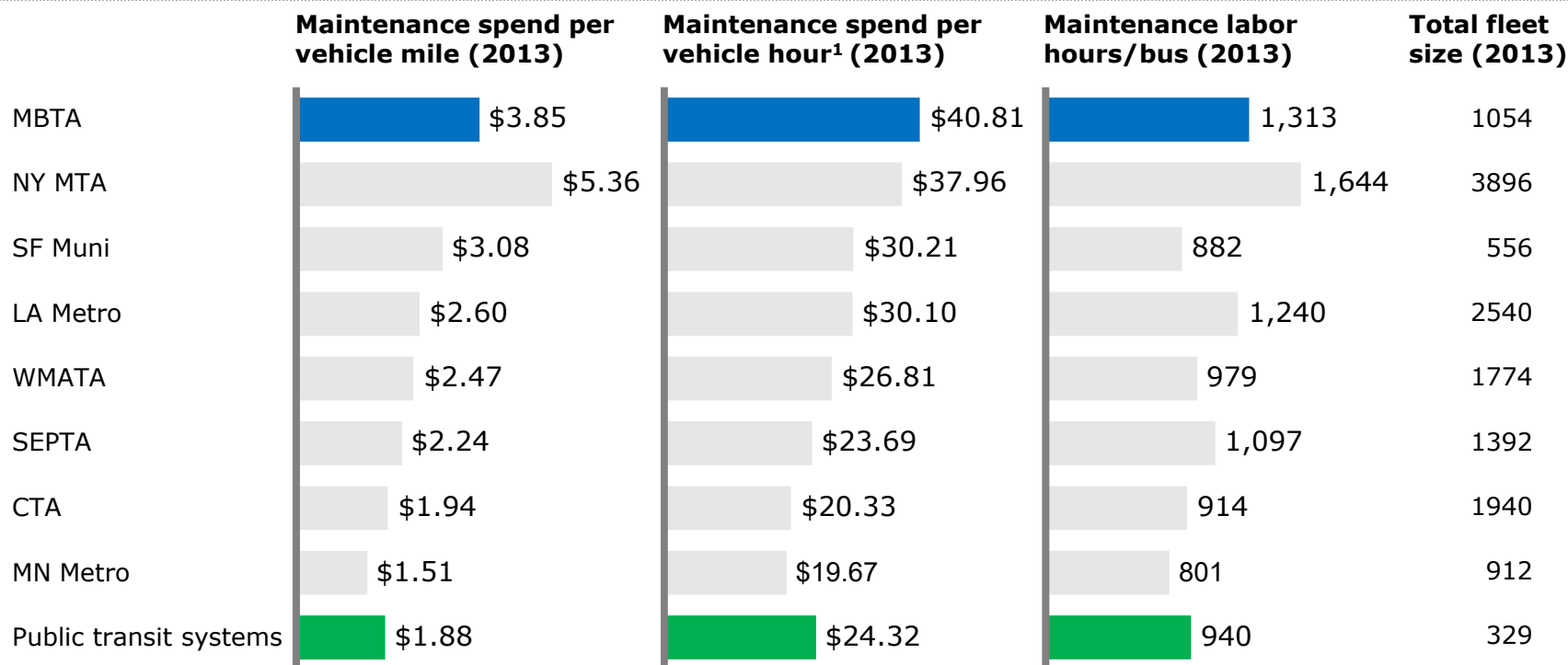


Note: Revenue hours reflect actual hours run, not scheduled hours; allocation for Everett heavy repair facility and G&A (admin.) added to Fellsway and Lynn based on their proportion of total annual vehicle hours

Source: MBTA Internal Data



Cost per total hours vs. peer agencies



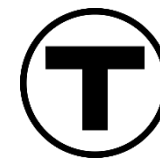
For the 7 large, urban transit peer comparisons above, the average fleet age was 10 years

“Public transit systems” average includes 71 public transit systems with

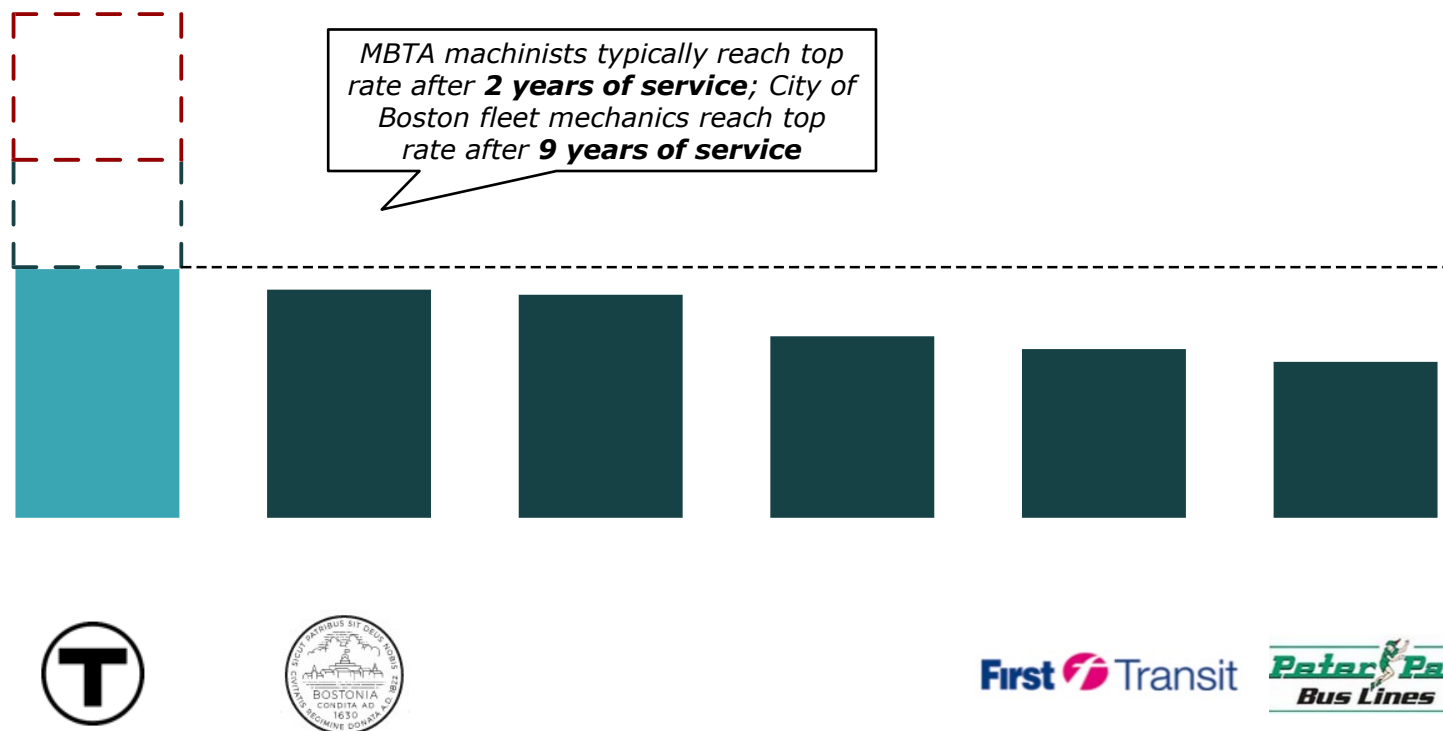
- Average fleet age older than 10 years
- Total fleet size over 100 buses
- Largely public, but some private operators

¹ Includes both revenue and deadhead hours

Source: National Transit Database. All numbers are for 2013 and include maintenance fuel expenditures, but not operating fuel expenditures



MBTA bus machinist wage rates



*Hourly mean wage of bus and truck mechanics and diesel engine specialists in Boston-Cambridge-Newton region in May 2015
Note: Peer systems (Chicago, NYC, and Washington D.C.) top wage rates are ~10% lower on average than the MBTA top rates
Source: MBTA Internal Data; Bureau of Labor Statistics; Interview with Peter Pan; CT Transit Salaries in CT from Indeed.com; Boston.gov